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DRAWINGS ATTACHED

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(54) A CLOSURE FOR AN AEROSOL OR LIKE PRESSURIZED CONTAINER

(71) We, SAMUEL TAYLOR PTY. LIMITED, a Company incorporated under the laws of the States of New South Wales, Commonwealth of Australia, of 293 Pacific Highway, Gore Hill, near Sydney, New South Wales, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention has reference to the sealing of aerosol or like pressurised containers. More particularly, it is concerned with the provision of a novel and improved seal for the container, the effect of which is increased with increasing pressure within the container, and which to some extent is insensitive to variations in the position of the cap on the container top or outlet and to inaccuries, if any, in the fixation of the cap to the container neck, e.g. by crimping.

In conventional aerosol containers the sealing of the container is effected, as a rule, by a ring or like annular sealing body accommodated within an annular space between the aforementioned chamber and the flange of the closure cap, the latter being secured over the neck of the container or bottle by crimping, clipping, screwing or otherwise. It is well known that with a sealing ring or annulus of rubber or other elastically deformable material, which overlies the container outlet or mouth, the sealing effect is diminished, and may even be eliminated altogether, if the cap together with the seal is lifted off the container mouth even slightly by the pressure prevailing within the container, particularly if the fixation of the cap to the container or bottle top is unsatisfactory or faulty — e.g., in the event of faulty or inadequate crimping. Also it is obvious that the interior pressure within the container or bottle tends to lift the cap together with the seal off the container mouh.

It is thus the main object of the present invention to provide a novel and improved seal in which any increase of the pressure on the seal tends to increase the adhesion of the seal to the neck of the bottle or container, rather than to diminish or eliminate the sealing effect.

This object is achieved in the invention by providing a ring of rubber or other elastically deformable material around the valve chamber or around some other cylindrical element connected with the cap. The cross-section of the ring may, for instance, be square or rectangular, or the ring may be an O-ring, the ring being fitted elastically and displaceably over the circumference of the valve chamber or of the cylindrical element. An inner flange or equivalent is provided around the valve chamber or around said cylindrical element on or near the closure cap and the elastically compressible ring is arranged on said chamber or element in such a manner that it is made to engage said inner flange under the action of a pressure prevailing within the container.

Thus, according to the invention a closure for an aerosol or like pressure container having a neck and a mouth therein, a cap placed on said mouth and over said neck, and a substantially cylindrical element connected with said cap and extending into the neck with clearance from the interior wall of said neck, comprises a ring of elastically deformable material elastically and displaceably fitted over the circumference of said substantially cylindrical element, the arrangement of the ring within the neck being such that its outer surface is an interference fit within said neck, and that a part of its surface is exposed to the pressure prevailing within the container, whereby the sealing effect of the ring is assisted.

It will be understood that with this arrangement the pressure within the aerosol container causes the elastically compressible ring to be urged towards said substantially cylindrical element or a shoulder provided thereon. As the elastic material of the ring which fits over the circumference of the valve

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chamber or of said substantially cylindrical element is unable to escape radially inward towards said chamber or element, it is forced radially outwardly by the pressure within the container whereby the ring is made to firmly engage the inner wall of the container neck or mouth, such engagement being intensified by any increase of the pressure within the aerosol container.

Thus, if the cap is not tightly crimped onto or otherwise secured to the container mouth, or if the crimping is damaged, such inadequacy of the closure does not affect the sealing effect ensured by the elastically compressible ring together with the inner wall of the container neck or mouth.

In order to more particularly describe the invention reference is made to the accompanying drawing which, by way of example only, illustrates various embodiments of the invention, and wherein:—

Fig. 1 shows in cross-section the neck of an aerosol container with a cap placed on its end, a valve chamber secured to the cap and a sealing ring of circular cross-section fitted over the circumference of said chamber;

Figs. 2 and 3 are views similar to Fig. 1 but showing constructions which include a ring of drop-shaped and of rectangular cross-section, respectively; and

Fig. 4 is a view in which the ring is placed upon a cylindrical element forming part of the cap, instead of on said valve chamber.

Identical or equivalent parts of the closure are denoted by the same reference numerals in all figures of the drawing.

Referring to Fig. 1, same shows a construction which includes a cap 5 of plastically deformable material provided with an outer flange 6 and with an interior flange 7, both flanges surrounding concentrically a central aperture 8 in the top 9 of the cap. The cap is placed over the neck 10 of an aerosol container, the cap overlying the end 11 of the container neck 10 with the outer flange 6 engaging the outer circumference 12 of said neck close to the outer end 11 of the latter, whereas the inner flange 7 of the cap 5 enters the mouth 13 of the container, being arranged in close vicinity to the inner wall of the neck 10.

The valve chamber 14 of the aerosol container is fitted into the space bounded by the inner side of the interior flange 7 and the top 9 of the cap 5 and it is retained therein by a shoulder 15 formed in the outer wall of the chamber 14 and by a corresponding shoulder 16 formed inside the flange 7.

A discharge tube 17 projects from one end of the chamber 14 and extends with clearance through the aperture 8, a gasket 18 of elastically compressible material being provided between the top face 19 of the chamber 14 and the inner surface of the top 9 of the cap which surrounds the aperture 8. Outside the container and at a distance from the outer surface of the top 9 of the cap 5, the discharge tube 17 carries, as usual, the spray head 20 which contains a spray nozzle (not shown).

In the embodiment shown a sealing ring 21 made of rubber, or of some other elastically deformable elastomeric material is elastically fitted onto the outer circumference of the chamber 14, the outer diameter of the ring 21 being so dimensioned that the ring is an interference fit within the inner wall of the container neck 10.

In the embodiment of Fig. 1 the ring 21 is an O-ring of substantially circular cross-section.

The arrangement illustrated in Fig. 2 differs from that shown in Fig. 1 in that the cross-section of the ring 21′ is of substantially drop-shaped cross-section. Accordingly the free end portion or extremity 23 of the flange 7 is shaped to recede angularly from the substantially cylindrical surface of the valve chamber 14. Thus, the tapering part of the ring cross-section enters the space 22 between the extremity 23 of the interior flange 7 and the chamber 14, the space 22 converging from said extremity towards the shoulder 15 of the chamber 14.

If so desired, the ring 21′ may be extended as indicated in Fig. 2 by dotted lines 24 to provide increased adhesion of the ring to the circumference of the chamber 14.

The arrangement of Fig. 3 differs from that according to Fig. 1 only in that the ring 21″ is of rectangular cross-section.

In the modification illustrated in Fig. 4 the interior flange 7′ comprises an annular base 25 which projects from the underside of the top 9 of the cap 5, and a substantially cylindrical extension 26 which depends from the base 25 and has an outer diameter smaller than that of said base 25, the extension 26 constituting the free end portion of the inner flange 7′. An annular shoulder 27 is formed in the outer wall of the flange 7′ where the base 25 and the flange extension 26 meet. Thus in the assembled closure the free end portion of the interior flange 7′, which projects into the container mouth 13, recedes from the interior wall 30 of the container neck.

It will be seen that in the modification of Fig. 4 the sealing ring 21‴ is slipped over the outer surface of the flange extension 26 i.e., over a cylindrical element other than the chamber 14 itself. The flange extension 26 projects into the mouth 13 of the container when the closure is applied to the container neck 10. As the ring 21‴ is elastically fitted over the outer surface of the flange extension 26 close to the base 25, it is forced by pressure prevailing within the container into sealing engagement with the base 25 and with the interior wall 30 of the container neck.

While in Fig. 1 the cap 5 is simply forced over the end portion of the container neck 10 and may be retained thereon e.g. by friction, or by a clip (not shown), Figs. 2, 3 and 4 show the free edge 28 of the depending outer flange 6 of the cap as being crimped over the end portion of the container neck 10.

It will, of course, be understood that modifications may be made within the scope of the invention.

Thus, for instance, the cross-sectional configuration of the resiliently compressible ring may be varied optionally, e.g. it may be made elliptical instead of circular or, if the cross-section of the ring is substantially square or rectangular, the corners of the square or rectangular cross-section may be rounded.

The above-mentioned shoulder 27 may either be provided especially within the closure cap, or it may be constituted by a part of the chamber or of the cap, irrespective of whether such part has or has not any additional function.

WHAT WE CLAIM IS:—

1. A closure for an aerosol or like pressurized container having a neck and a mouth therein, a cap placed on said mouth and over said neck, and a substantially cylindrical element connected with said cap and extending into the neck with clearance from the interior wall of said neck, the closure further comprising a ring of elastically deformable material elastically and displaceably fitted over the circumference of said substantially cylindrical element, the arrangement of the ring within the neck being such that its outer surface is an interference fit within said neck, and that a part of its surface is exposed to the pressure prevailing within the container, whereby the sealing effect of the ring is assisted.

2. A closure as claimed in Claim 1, wherein said substantially cylindrical element is constituted by a valve chamber which forms a part of said aerosol or like pressurized container, and the cap is provided with an outer flange which in the assembled closure overlies the mouth and at least a part of the neck of said container and with an inner flange which is spaced from said outer flange and depends from the side of the cap which in the assembled closure overlies the container mouth while said inner flange enters the gap between the outer wall of said chamber and the inner wall of said neck, and wherein said ring is fitted over the substantially cylindrical outer surface of said chamber in a position close to said inner flange, so that it is forced by interior pressure prevailing within said container into engagement with the free end of said annular flange.

3. A closure as claimed in Claim 2, wherein said ring is of circular cross-section.

4. A closure as claimed in Claim 2, wherein said ring is an O-ring.

5. A closure as claimed in Claim 2, wherein said ring is of substantially rectangular cross-section.

6. A closure as claimed in Claim 2, wherein said ring is substantially drop-shaped in cross-section, and the free end portion of said inner flange which in the assembled closure extends into the container mouth, recedes angularly from the substantially cylindrical surface of the valve chamber, the tapering part of the ring cross-section extending into a space between the substantially cylindrical surface of the valve chamber and the free end portion of said flange which angularly recedes from said surface.

7. A closure as claimed in Claim 2, wherein said inner annular flange has an annular base which depends from the side of the cap which in the assembled closure overlies the container mouth, and has a substantially cylindrical extension which projects from said annular base and recedes from the interior wall of the container neck, a shoulder being provided in the outer surface of said inner flange between said base and said cylindrical flange extension, said ring being elastically fitted over the outer surface of said flange extension close to said shoulder so that the ring is forced by interior pressure prevailing within the container into sealing engagement with the base of said inner flange and with the interior wall of the container neck.

8. A closure as claimed in any one of Claims 2 to 7, wherein said valve chamber is retained, within a space bounded by said inner flange, by shoulders provided in the circumference of said chamber and in the inner surface of said inner flange, respectively.

9. A closure for an aerosol or like pressurized container, substantially as illustrated in the accompanying drawing and as described with reference thereto.

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2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

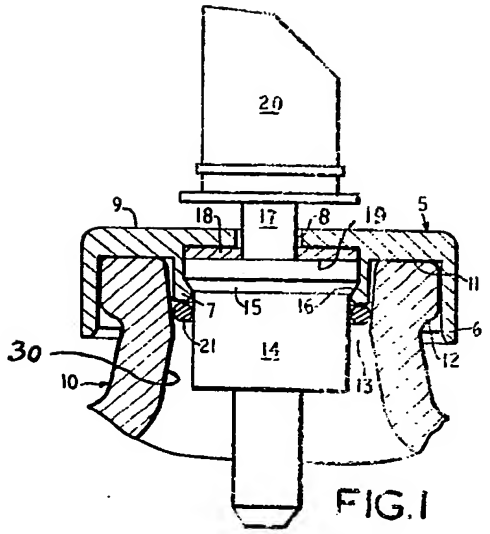

FIG.1

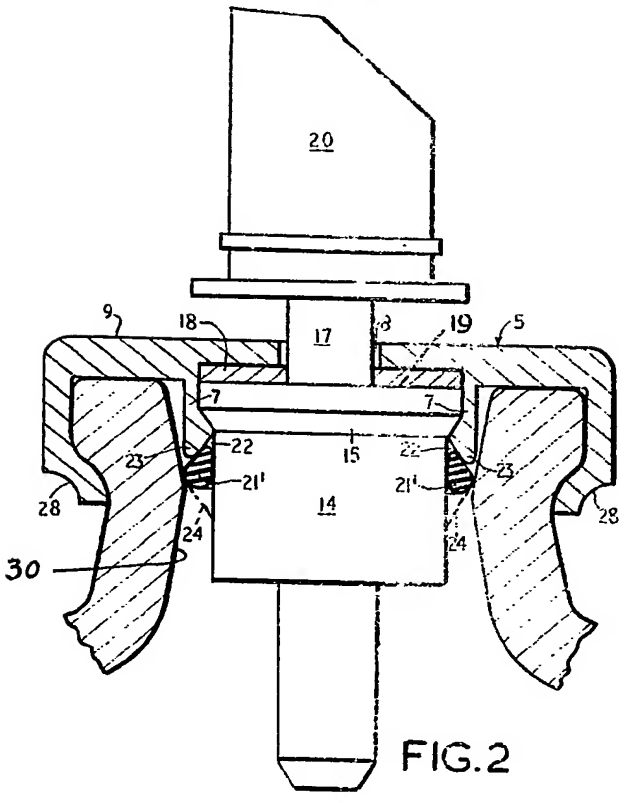

FIG.2

1219935 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 2

Fig.3.

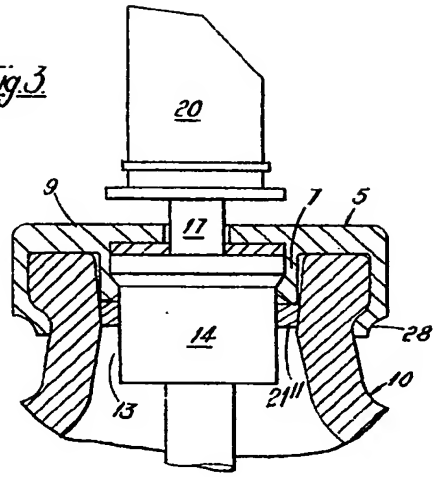

Fig.4.